plant can be used again. The old process of dissolving the fuel assemblies had been used there, and planners want to switch to the chop-and-leach process. Belgonucleaire officials say that in the course of modification, a coprecipitation technique could also be introduced at the back end, providing premixed plutonium and uranium oxides appropriate for plutonium fuel fabrication. The back end of the plant could also be enlarged to permit handling of higher plutonium throughputs, so fuel could be recycled twice.

Officials in the Belgian utility industry are considerably more guarded in their assessment of the recycle possibility. "There is certainly no definite position, or opposition," said an official at Traction et Electricite, which operates the nuclear station at Doel, with two units in operation and two more under construction. Although, he said, eventual plutonium recycle is envisaged, it finally "will depend on the price."

An official at the Union des Exploitation Electrique de Belgique, the utility association, was more skeptical. "We are discussing it," he said, "but we are not that warm on that idea for the moment." The Traction et Electricite official did note, however, that the fuel storage facilities at the new power plants at Doel have been expressly designed to safely accommodate plutonium fuel in the event of recycling.

Nor are Belgonucleaire and government officials in full agreement. Belgonucleaire stresses that coprecipitation hasn't been definitely agreed upon by all parties concerned should the Eurochemic facility reopen. In addition, some financial arrangement would have to be worked out between the company and the new operators of Eurochemic, because the back-end modifications would make reprocessing more expensive and plutonium fuel fabrication less expensive. "What you lost at the reprocessing step you win at the refabrication step," said a Belgonucleaire official.

A Belgonucleaire manager argued that, although there isn't much current possibility of plutonium recycling elsewhere because no reprocessing plant is willing to accept irradiated mixed-oxide fuel, because the Eurochemic plant must be renovated in any event, it can be economically feasible in Belgium. "We expect that if a decision is taken in our country concerning the reprocessing installation, the Belgian utilities will also decide to make use of the plutonium produced in that plant."

When the four power plants under construction are added to the three in operation, Belgium will have some 5,500 Mw of nuclear electricity generation producing 160 tons of spent fuel containing one ton of plutonium each year. Belgonucleaire estimates that Belgian uranium requirements could be reduced by 40% by recycling that plutonium. – *Doug Glucroft, Brussels*

INDIA, FEARING ENRICHED URANIUM SHUT-OFF, BELIEVED GEARING UP FOR MIXED-OXIDE FUEL

There are growing indications that India is gearing up for production of mixed-oxide fuel to substitute for U.S. enriched uranium when the supplies stop. India is well aware that the U.S. Republican Party platform stated there should be no more fuel shipments to the U.S.-supplied twin 210-Mw Tarapur BWRs near Bombay.

The latest development is the reappointment of Raja Ramanna to the head of the Bhabha Atomic Research Center (Barc) with a specific brief to devise a crash program to evolve the fuel. "He must also evolve alternative fuel for the fast breeder reactor at Kalpakkam since the French are dragging their feet in supplying highly enriched fuel for it," announces the daily National Herald newspaper published by leading members of Prime Minister Indira Gandhi's party.

Scientists at Barc are believed already to have been using hot cells to perfect mixed-oxide technology. The problem now facing them will be perfecting the fabrication processes, particularly those for mass production.

Plutonium required for the mixed-oxide fuel could be recovered during reprocessing of spent fuel at the Tarapur reprocessing plant. This is the facility which has been idle since 1976 because of India's inability to reach a "joint determination" with the U.S. over its safeguardability.

Now that the U.S. has relinquished its "determination" role in favor of the bilateral "subsidiary arrangements" for safeguarding negotiated by India and the IAEA last year (NW, 18 Dec. '80, 1), India can use the plant.

The agency has determined that "safeguards can be satisfactorily implemented," Homi Sethna, chairman of India's Atomic Energy Commission, told an IAEA meeting in Vienna Sept. 22. "Now we are ready to commence reprocessing of power reactor fuel."

The move to evolve a suitable mixed-oxide fuel for Tarapur could have "important repercussions on the future direction of our program," says a source close to India's nuclear industry who refused to be identified.

"We all know the LWR is very efficient. Supposing we are able to sort out and develop the mixed-oxide. The Germans and the Japanese claim they are almost there. We could move on to LWRs instead of concentrating solely on our pressurized heavy water reactor design," he points out.

This would mean that India would be able to eke out its limited uranium resources over a much longer time-frame than with its Candu-style reactors, he adds. (Current indications are that the country's uranium resources will only be able to support a natural uranium reactor program of the order of 10,000 Mw over its lifetime.)

Ramanna, Barc's new head, told Nucleonics Week that utilizing mixed-oxide fuel in LWRs "would work in principle" but he refused to comment on whether it would be an option for India. Ramanna was with Barc in the early 1970s but was moved to defense by the previous Janata government. For the past couple of years he has been directing India's scientific research effort in the wider field of defense as scientific adviser to the Defense Ministry.

Technically, there is nothing to prevent India or any other technologically competent nation from moving into plutonium recycle in LWRs, observers say, for there has been considerable experimental and demonstration experience built up around the world. Although nations with few or no energy fuel resources – Japan and West Germany, for example – have planned to do so, the decreases in rate of energy demand growth and in uranium prices have eased the pressures on them to some degree, the sources say.

It was generally assumed that most countries would proceed with the recycle of plutonium in LWRs before the U.S. Ford and Carter Administrations saw the need to proceed more cautiously and President Carter came out with his "no-reprocessing" stance in April 1977, which led to Infce.

As Joseph S. Nye, then deputy to the under secretary of state for security assistance, science & technology, said soon afterwards: "Mixed-oxide fuel itself contains more readily re-

coverable plutonium than that in spent LWR fuel. While a substantial increase in the accessibility of weapons-usable material does not necessarily lead to its misuse, it could both facilitate any country's acquisition of nuclear weapons and increase uncertainty about the nation's intentions."

– Pearl Marshall, New Delhi

WYDLER TELLS REAGAN TO AVOID FIGHT ON NNPA WHILE SHIFTING U.S. NONPROLIFERATION POLICY

The Reagan Administration should not push to amend the Nuclear Nonproliferation Act of 1978 immediately after assuming power because of strong opposition expected in the House Foreign Affairs Committee, says former New York congressman John Wydler. Instead, Reagan should use his executive powers to make several changes in U.S. nonproliferation policy while he develops a strategy to get favorable consideration of NNPA amendments in the House, Wydler says in a white paper submitted to the Reagan transition team.

Wydler was the ranking Republican member on the House Science & Technology Committee until he retired after the 96th Congress. He suggests that Reagan take steps to immediately expedite NRC and State Department review of export licenses, particularly in cases where no sensitive nuclear technology or materials are involved. Reagan should move "to reassure our friends that nonproliferation policy will neither be used to deny them uranium nor nuclear technology. . . . The general approach should be to rejuvenate the Eisenhower 'Atoms for Peace' concept through aggressive nuclear leadership in the framework of assured energy supply while addressing realistic concerns about proliferation," Wydler says.

Nonproliferation policy can also be affected by Reagan's appointments to policy posts in the Departments of Energy, State, and Commerce as well as the National Security Council and the Arms Control & Disarmament Agency, and to nuclear technology transfer posts in NRC, DOE and the State Department.

Reagan should also establish procedures for prompt issuance of export licenses to nations with good nonproliferation credentials when those countries make such issuance a condition for accepting U.S. industry bids. Further, the new Administration should extend the cooperative agreement with Euratom so that the U.S. can renegotiate a new agreement under an amended NNPA. In addition, the Administration should modify the existing executive order requiring an environmental impact statement for U.S. reactor export. Wydler says this "unique practice not only imperils U.S. exports but offends foreign governments because it presumes that the U.S. has more concern about health, safety and the environment than the customer nation."

In his paper Wydler also suggests a number of changes to the NNPA, including the following:

– Replace requirements for renegotiation of international agreements with tight criteria so that the new policy assumes the traditional U.S. approach of "honoring the sanctity of contracts";

– Strongly support the idea of international plutonium management as a prerequisite for commercial use of breeders and of plutonium in fuel;

– Promote an international organization for reprocessing, plutonium storage, enrichment, fresh fuel transport and storage, and spent fuel storage and management;

– For countries that have renegotiated their agreements for nuclear cooperation, require an annual blanket State Department notification to take the place of the case-by-case notification now required;

– Provide for blanket export licenses for the lifetime of specific reactors, with executive branch or NRC review required only if a country does prohibited things with sensitive technology or materials, or if there is good reason to expect it will do so;

– Set a deadline for all government action associated with a nuclear export license, and require licensing if action has not been completed when the deadline passes, unless the President determines otherwise.

Wydler also recommends that export licensing authority be transferred from NRC to the State Department "so that NRC resources can be devoted to enhancing domestic nuclear safety." Further, he says, the Atomic Energy Act should be amended to include a statement of support for prompt development of the breeder and for future use of plutonium as a fuel under international management.

GOVERNOR STAYS UNC CHURCH ROCK EXECUTION

Gov. Bruce King of New Mexico, acting against the advice of his Environmental Improvement Division (EID), announced Jan. 9 that the state would allow United Nuclear Corp. to continue operations at its Church Rock mill for at least another 60 days, during which time the company would have to demonstrate to the state its ability to stem seepage from its tailings disposal area.

The governor said he had received assurances from UNC president Keith Cunningham that headway has been made on the seepage problem since a new well-intercept system was installed in September. The governor also said he had received assurances that the company would "cooperate" with the EID in resolving the matter. Neither the governor nor UNC officials have said, however, that seepage at the Church Rock mill site has been halted completely, but the governor did acknowledge that protection of 700 jobs at the mill and mine weighed heavily in his decision.

On Jan. 6, EID Director Thomas Baca advised the governor that UNC's seepage-intercept system had so far proven "inadequate," and that the mill should be closed until the company could demonstrate that seepage had been halted. Baca told NuclearFuel that he told the governor that, based on data supplied by the company, seepage of acidic, radioactive and toxic materials into ground water totaled some 70,000 gallons a day.

UNC, however, argued that the 70,000-gallon estimate was drawn from an analysis made shortly after the well-intercept system was put in place and that a more recent review showed that seepage was more in the neighborhood of 7,000 gallons a day. Said UNC's Richard Ross, "I think we will be able to prove soon that we are able to get a net backflow of water." Ross added that the drop from 70,000 to 7,000 gallons a day over a two-month period shows that the well-intercept system is working.

Baca has argued that even if the company has reduced seepage to the level it claims, seepage is still enough "to cover